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# CATECHISM

OF

# ICHTHYOLOGY;

BEING A

## Description

OF

THE NATURAL HISTORY

OF

# FISHES.

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LONDON:
Printed for
G. & W. B. WHITTAKER,
AVE-MARIA-LANE.

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H. H. Drayton

PINNOCK'S CATECHISMS.

A

# CATECHISM

OF

# ICHTHYOLOGY;

BEING A

## FAMILIAR INTRODUCTION

TO THE

## NATURAL HISTORY OF FISHES.

SCIENTIFICALLY ARRANGED.

THIRD EDITION.

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13, AVE-MARIA-LANE, LUDGATE-STREET.

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Q. By what means are the bodies of fish secured from the *macerating* influence of the water?

A. Besides a strong scaly covering with which many species are furnished, they are protected from the influence of the waters by a *glutinous* matter, which is an effectual preservative against the ill effects which might otherwise arise from the element in which they dwell.

Q. Do fish possess the external senses in perfection?

A. It is impossible to answer this question with certainty; but it is probable that their scaly covering renders their sense of touching very imperfect; that from their hard bony palate, they can have but little delicacy of taste; the *density* of the fluid in which they live must render their sense of smelling not very acute; and it is very doubtful whether they hear at all.

Q. Is not their sight very quick?

A. Their sight is supposed to be quick, but, from the structure of the eye, there is reason to believe that their powers of vision do not enable them to discern objects at a considerable distance.

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Ma″cerating, *part.* wasting, wearing away.
Glu′tinous, *a.* gluey, sticky.
Den′sity, *s.* closeness.

Q. For what are fish particularly remarkable?

A. For the *voraciousness* of their appetite and for the strength of their digestive faculties. They live in a state of warfare continually, the stronger preying on the weaker; and their stomachs will digest even the hardest shells.

Q. Are fish long-lived?

A. Yes; some are particularly long-lived; a carp, for instance, has been known to live above a hundred years.

Q. How may the age of a fish be ascertained?

A. The age of a fish may be ascertained by examining one of its scales with a microscope; it will be found to consist of a number of circles one within another, and each of these circles corresponds with one year of the fish's life, so that by counting the circles, we may easily ascertain the creature's age.

Q. Is there any method of ascertaining the age of such as have no scales?

A. Yes; the same knowledge may be obtained of those destitute of scales, by separating the joints of the backbone, and observing the number of rings on the surface when they were in contact.

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Voraciousness, *s.* greediness.

Q. Are not fish in general extremely prolific?

A. Yes; an eminent Dutch naturalist * has said, that a single cod will produce nine millions of eggs in a year, a flounder one million, and a mackarel five hundred thousand.

Q. Do fishes display any affection for their young?

A. With few exceptions, fishes not only are destitute of all tenderness for their young, but frequently devour them with the utmost greediness.

Q. Into what orders are fish usually divided?

A. Linnæus has divided this class of animals into six orders:—1. Apodes; 2. Jugulares; 3. Thoracici; 4. Abdominales; 5. Branchiostegous; 6. Chrondropterygious.

Q. How may these several orders be distinguished?

A. The Apodes are without *ventral* fins; 2. In the Jugulares the ventral fins are before the *pectoral*; 3. the Thoracici have the ventral fins under the pectoral; 4. the ventral fins of the Abdominales are behind the pectoral; 5. The Branchiostegous are distinguished by gills without bony rays;

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Ventral, *a.* belonging to the belly.
Pectoral, *a.* situated on the breast.
* Lewenhoeck.

and, 6. The Chrondropterygious have their gills cartilaginous, or of a gristly substance.

Q. Is there not a more simple division than this?

A. Yes; Fish are divided into cetaceous, cartilaginous, and spinous; all of which differ in their appearance, conformation, and habits.

## CHAPTER II.

### *Of Cetaceous Fish.*

Q. WHAT is meant by Cetaceous Fish, and how are they distinguished?

A. Cetaceous fish are those of the Whale kind *, which, from their peculiar characteristics, have been classed by Linnæus, among terrestrial animals of the class Mammalia †.

Q. Describe them.

A. They breathe by means of lungs, have their stomach and intestines like those of quadrupeds, and their eyes defended by lids; they bring forth their young alive and suckle them, and they

* From *cete*, a whale.

† Those that suckle their young.

cannot remain constantly beneath the water; their tail, unlike that of the other orders of fish, is horizontal or parallel with the water, and they have only three fins.

Q. Enumerate the principal genera belonging to this order.

A. The Balæna, or Whale; the Physeter; Cachelot, or Spermaceti Whale; the Delphinus, or Dolphin; and the Monodon, or Sea Unicorn.

Q. What may be observed of the genus Balæna?

A. Of the Balæna, or Whale, there are several species, as the Mysticetus, black or Greenland whale, Glacialis or Iceland whale, Physalus, or fin fish, so called from its larger *dorsal* fin, and the Rostrata or piked whale, the smallest of the genus, seldom exceeding twenty-five feet in length.

Q. Will not a description of the Mysticetus, give a tolerable idea of the whole genera?

A. Yes; it is the largest animal of which we have any authentic account, being sometimes found in the northern seas, ninety feet long, and there is reason to suppose that when unmolested and suffered to attain its full age, it greatly exceeds that length. Whales are occasionally

Dorsal, *a.* belonging to the back.

met with in the southern seas, one hundred and sixty feet long.

Q. Describe the external form of this huge animal.

A. The head is exceedingly large, being full one third of the whole length of the animal. Its mouth is destitute of teeth, but their place is supplied by a horny substance erroneously called whalebone; the tongue, which is soft and spongy, is often eighteen feet long and ten broad; the eyes are not larger than those of an ox; the ears are small holes, immediately behind the eyes, and on the top of the head are two orifices, through which the animal occasionally spouts water to a considerable height; the *lateral* fins are about ten feet long, and have their origin near the angles of the mouth, and the body gradually tapers to the tail.

Q. What is the principal food of the whale?

A. Though the whale is of such enormous magnitude, its *gullet* is not sufficiently capacious to swallow a fish larger than a herring; its chief support is, therefore, a species of snail, and different

---

Lat'eral, *a.* belonging to the sides.

Gul'let, *s.* the throat; the passage through which the food enters the stomach.

kinds of worms, found in vast abundance on the surface of the sea about Spitzbergen.

Q. Is not this genus capable of strong affection?

A. Yes; its affection for its mate exceeds almost every thing of the kind related of irrational creatures, and its fond attachment to its young can be extinguished only by death. When pursued, it clasps its cub between its fins, and thus endeavours to shield it from danger *.

Q. Is the whale in any way useful to man?

A. Yes; besides the substance already mentioned, called whalebone, it yields an amazing

* The following anecdotes may serve to illustrate these assertions. Two whales, a male and a female, being in company, the former was harpooned by a fisherman, and, after a long and terrible resistance, in which, by a stroke of its tail, it struck down a boat with three men in it, sunk under the number of its wounds; its faithful companion lent it every assistance, and at length, disdaining to survive its loss, with great bellowing, stretched itself on the dead fish and shared its fate.—A whale and her cub had got into an arm of the sea at the Bermudas, or Somer's Islands, and, by the ebbing of the tide, were unable to retreat; the people from the shore soon surrounded them with boats, and wounded them so severely that the sea was discoloured with their gore. At length the mother forced a passage over the shallow, and might have escaped; but, finding that her young one could not follow her, she returned to share its fate; happily the rising of the tide relieved them from their prison, though it is probable that they afterwards perished from their wounds.

quantity of oil; the tongue alone frequently furnishing five or six barrels.

Q. How is this enormous animal taken?

A. Ships are sent out fitted up for this particular service. As soon as a whale is perceived, several boats approach the animal with the utmost silence and caution; as soon as they are within a proper distance, the man at the head of the nearest boat darts into the whale a harpoon or barbed weapon, to which a great length of rope is attached.

Q. Does the whale die immediately?

A. No; on feeling itself wounded, the whale runs off with prodigious *velocity*, drawing the rope after it; but, as it is necessitated to come often to the surface to breathe, it is again wounded, and again it dives, till at last, weakened by repeated wounds, it can no longer endeavour to escape, but spouts up water, mixed with blood, and soon after expires.

Q. How is such an enormous animal disposed of?

A. The whale, being dead, is *lashed* along side

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Velocity, *s.* swiftness.
Lashed, *v.* fastened with ropes.

the ship, and several men, with irons on their feet, to prevent their slipping, get on its body, and, with long knives, cut out pieces of fat about three feet thick and eight long, which are called blubber; these are put up in barrels and brought home for the purpose of having the oil extracted *; the rest of the carcase is turned adrift, to be the prey of bears, voracious fish, and sea fowl.

Q. What are the distinguishing characteristics of the 2nd class, or Physeter?

A. The most prominent characteristics are, that the jaws are unequal and furnished with teeth, which are sometimes straight, and sometimes *curved*, like a sickle. Below the snout is the cavity, from whence most of the Spermaceti is obtained.

Q. What are the principal species of this genus?

A. Physeter Macrocephalus, or large Spermaceti Whale; Physeter Trumpo, or blunt-headed Cachelot; and Physeter Microps; black-headed Cachelot. Of these, the first being the largest, will serve as a specimen of the rest.

Q. Give some particulars of the Macrocephalus.

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Curved, *a.* crooked, bent.

* The fat of the whale lies next the skin as in swine.

A. The Physeter Macrocephalus, or large Spermaceti Whale, is often found sixty feet in length and thirty in circumference. It has its lower jaw furnished with a row of strong conical teeth, and in the upper are corresponding cavities to receive them when the mouth is closed.

Q. What farther is remarkable of this fish?

A. The tongue which is an immense mass of flesh, of a *livid* red colour, is, when roasted, considered as delicious food, and the bones are used in the construction of various implements; but that for which the fish is principally sought after, is the substance called Spermaceti, which the head yields in great abundance. This whale is found chiefly in the Greenland seas and in Davis's Straits.

Q. Are not some species of this genus of a very rapacious nature?

A. Yes; particularly the Mycrops, which not only commits great slaughter among the inferior finny tribes, but actually encounters many other species of whales, and even makes a prey of the pike-headed whale and the porpoise.

Q. Of what species is the genus Delphinus composed?

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Liv'id, *a.* dark; discoloured with black and blue spots.

A. The principal species that compose this genus are, Delphinus Delphis or the Dolphin, Delphinus Phocæna or Porpoise, Delphinus Orca or Grampus, and Delphinus Gladiator or the Sea Sword.

Q. Give some account of the Dolphin.

A. Delphinus Delphis, or the Dolphin, is usually of the length of from five to ten feet. Its motions are so rapid, that it is called by mariners, the arrow of the sea. The marvellous stories that have been related of it by ancient poets and historians, have, however, no foundation in truth.

Q. Describe the Porpoise.

A. Delphinus Phocæna, the Porpoise, is usually six or seven feet long, with a thick round body, which gradually diminishes towards the tail. The flesh of this fish is by no means ill-tasted, and it yields a considerable quantity of excellent oil. Previous to a storm, porpoises are frequently seen playing their gambols near the surface of the water.

Q. What distinguishes the Grampus?

A. Delphinus Orca, the Grampus, the largest fish of the genus, is often found twenty-five feet long and twelve or thirteen in circumference. Its most distinguishing mark is its dorsal fin, which is of a

*conical* shape, and nearly four feet in height. It is a most voracious fish, preying chiefly on seals, flat fish, and sometimes even on the porpoise.

Q. Describe the Sea Sword?

A. Delphinus Gladiator, the Sea Sword, is extremely ferocious, and a deadly foe to the whale; several of these in company will attack the huge but inoffensive animal, tearing out large pieces of its flesh. When it becomes fatigued by the combat, the whale lolls out its tongue, which is instantly seized by its cruel enemies and torn from its mouth.

Q. Are there any remarkable species in the genus Monodon?

A. The only species discovered as decidedly belonging to this class is the Monodon Monoceros, Narwhal, or Unicorn Fish. This fish is about twenty feet long and spotted; it has only one blow-hole and no teeth in the mouth, but, from the upper jaw, there proceeds one long tooth *, wreathed or twisted in a *spiral* form.

Q. Is this fish useful to mankind?

A. Yes; its horn or tooth affords finer ivory

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Co'nical, *a.* in shape resembling a sugar-loaf.
Spiral, *a.* like the twisting of a snail's shell.

* In some subjects there are two.

than the tusk of the elephant, and the oil which it yields, though small in quantity, is much valued. By the Greenlanders its flesh is much relished; with its fat they supply their lamps; of the tendons they make excellent thread, and of its teeth, hunting implements, or stakes, for the construction of their huts.

## CHAPTER III.

### *Of Cartilaginous Fish.*

Q. By what peculiarities are Cartilaginous Fish distinguished?

A. Fish of the Cartilaginous kind have not bone as the Cetaceous and Spinous fish, but their muscles are supported by a soft substance, resembling gristle. Like the first class, they are furnished with lungs, and with gills like the last, so that they can breathe through either one or the other, as they may have occasion to continue above or below the water.

Q. What are the principal divisions of this class?

A. Cartilaginous fish are divided into—1. those of the Shark kind; 2. those of the Flat Fish kind; 3. those of the slender Snake-shaped kind; 4. the Sturgeon and its varieties.

Q. Enumerate the principal species of the Shark genus.

A. The principal species of the Shark genus, or genus Squalus, are Squalus Carcharias, White Shark; 2 S. Maximus, Basking Shark; 3. S. Catulus, Spotted Shark; 4. S. Stellaris, Rock Shark; 5. Squalus Ocellatus, ocellated * Shark; 6. S. Zygæna, Hammer-headed Shark; 7. S. Pristis, or Saw fish.

Q. Which of these species most deserve our notice?

A. The most remarkable of these species are—the White, the Basking, the Hammer-headed Shark, and the Pristis.

Q. Describe the White Shark.

A. Squalus Carcharias, or the White Shark, is of a lare size, sometimes measuring thirty feet in length. It is considered as the most voracious of all the inhabitants of the deep, and devours indiscriminately every kind of animal substance that comes in its way; its mouth is of vast width, furnished on the margin of each jaw with from three to six rows of sharp pointed teeth, which it

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* Adorned with spots or eyes.

can *elevate* or *depress** at pleasure, and its throat is extremely capacious.

Q. Proceed with your description.

A. The tail of this genus has one of its *lobes* much longer than the other, and such is its strength, that even a young shark of only six feet in length, is able, with a stroke of it, to break a man's leg; for this reason, it is usual, with sailors, to cut off the tail of the shark with axes, the moment it is taken on board.

Q. Is this fish formidable as well as voracious?

A. Yes, highly so; for, notwithstanding its immense bulk, it exceeds all other fish in agility, and can outstrip the fleetest ships. They generally attend vessels for the purpose of catching the garbage that is thrown overboard. Should a man have the misfortune to fall into the sea, his destruction is *inevitable*, as he is devoured in a moment, without a possibility of rescue †.

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Lobes, *s.* divisions.

Inevitable, *a.* unavoidable, certain.

* Raise or sink down.

† Sharks are the constant attendants of slave ships, and feed sumptuously on the bodies of the unhappy victims that perish in the passage, or voluntarily throw themselves overboard. A young female slave, abandoning herself to despair, on being torn from her friends and country, had determined to drown herself, but her design was discovered and prevented. To give her, however, a taste of the death

Q. What is particular to the Basking and Hammer-headed Sharks?

A. Squalus Maximus, or the Basking Shark, is as large as the white shark, but of very different habits, it being as gentle as the other is ferocious. It feeds on sea plants, and is caught for the sake of its liver, which yields a considerable quantity of oil. The Hammer-headed Shark, or Squalus Zygæna, is so denominated from the remarkable shape of its head, which is *dilated* on each side; the eyes, which are very large, being at the extremities. It is an extremely voracious fish, and will attack men.

Q. What may be observed of the Pristis?

A. Squalus Pristis, or the Saw Fish, is a large species of shark, the head slightly flattened, and *produced* in front into a very long, flat, straight,

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she coveted, the inhuman captain ordered her to be let down into the sea by ropes; no sooner was this done, and her head only above water, than she uttered a fearful scream, and the sea around appeared crimsoned with her blood. On hastily drawing her up, it was found that a shark had bitten off the whole lower part of her body from the waist. Numerous anecdotes of this kind might be brought to illustrate the rapacity of this formidable animal, would our limits allow.

Dila'ted, *part.* widened, flattened.

Produced, *part.* a term in mathematics, signifying lengthened or drawn out.

and tapering bony substance, *dentated* at the edges so as to resemble a saw.

Q. What are the distinguishing characteristics of Flat Fish of the Ray kind?

A. All fish of the Ray kind are broad and cartilaginous, swim flat upon the water, and have spines upon different parts of their body or tail: their eyes and mouth are placed under their body, they have teeth, and their tail resembles that of a *quadruped* rather than a fish.

Q. Are these fish numerous?

A. Yes; their formidable size and defensive spines render them secure against the attacks of other rapacious fish, and consequently prevent their numbers being thinned, as is the case with most others.

Q. What is the usual food of this genus?

A. Rays in general feed on the smaller kinds of crabs, shell-fish, marine insects, and small fish: they lie concealed, during part of the winter, among the mud or sand at the bottom of the sea, but occasionally *emerge* and swim in pursuit of their prey.

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Den'tated, *part.* furnished with points like teeth.
Quadruped, *s.* a four-footed animal.
Emerge, *v.* come forth.

Q. Enumerate the principal species of this genus.

A. Of the nineteen species of which this genus is composed, those most deserving of our attention are, 1. Raja Batis, the Skate; 2. Raja Clavata, the Thornback; 3. Raja Pastinaca, the Stingray, or Fire Flare; 4. Raja Diabolus, the Sea Devil; and 5. Raja Torpedo, the Torpedo.

Q. Describe the Skate.

A. Raja Batis, or the Skate, is a large species of Ray, weighing frequently from two to three hundred pounds. Its upper part is brown, varied with blackish wavy lines, the under part white, with black spots; there is a sharp *spine* on each side the base, and several strong ones down the middle of the tail. This fish is much esteemed for the table. It is in its highest perfection in May.

Q. What is the Thornback?

A. Raja Clavata, or the Thornback, greatly resembles the Skate both in figure and size, though, in general, it is rather less. Its most distinguishing feature is, that its back is covered with strong curved spines, and sometimes there are several rows continued to the tip of the tail. It inhabits the Mediterranean, and is in some esteem, but is not equal to the skate in goodness.

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Spine, *s.* a sharp point resembling a thorn.

Q. Is not the Sting Ray a formidable species?

A. Yes; Raja Pastinaca, the Sting Ray, or Fire Flare, is less than the species before mentioned, but more formidable, from a very long, flattened, and sharp-pointed spine on the tail, of a flinty hardness, with which, though it is not *venomous*, as the fishermen absurdly believe, it can inflict very painful and severe wounds on those who incautiously handle it. It is eaten, but is not in great esteem.

Q. Why is the next species called the Sea Devil?

A. Raja Diabolus, or the Sea Devil, is so called from its generally hideous appearance, and from its having a projection on each side of its head, nearly two feet in length, resembling horns. It is found chiefly about the Azores.

Q. For what is the Torpedo principally remarkable?

A. Raja Torpedo, the Torpedo, is principally remarkable for its wonderful faculty of causing a sudden numbness, or painful sensation in the limbs of those who touch it. It is of a nearly circular shape, perfectly smooth and of a reddish brown colour on the upper part. If accidentally trodden on while buried under the sand in shallow water, it

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Ven'omous, *a.* poisonous.

gives so forcible a shock as to throw down the person who thus inadvertently annoys it.

Q. What are the organs that produce this surprising effect?

A. The electric organs of the Torpedo constitute a pair of galvanic batteries, consisting of little laminæ or pellicles*, arranged in columns, and separated by moisture.

## CHAPTER IV.

### *Of Cartilaginous Fish (continued.)*

Q. WHAT are the principal genera of the Slender snake-shaped kind Cartilaginous Fish?

A. There are but few genera of this kind of Fish; the Lamprey will serve as a specimen.

Q. Are there not several species of this genus?

A. Yes? there are eight species, having in common seven spiraculæ, or breathing holes, on each side the head; no gill, a fistula, or spouthole, on the top of the head, and no breast or belly fins. The species are distinguished by peculiarities on their back fins.

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* *Laminæ* or *pellicles* are thin skins lying over one another.

Q. Describe the most remarkable of these species.

A. Petromyzon Marinus, or the Sea Lamprey, greatly resembles an eel in shape, and sometimes weighs four or five pounds. It can, at pleasure, swim with considerable rapidity, but its usual situation is attached to some large stone or other substance, by the mouth; and so forcibly does it *adhere*, that a stone of ten or twelve pounds may be raised by taking the fish without obliging it to let go its hold.

Q. What further may be observed of the Lamprey?

A. The general habits of the Lamprey greatly resemble those of the eel, and like that fish it is extremely *tenacious of life*—not only, when cut in pieces, will the several parts continue to move for a long time, but the Petromyzon Planeri, a species found in Germany, will remain alive a quarter of an hour in spirits of wine, moving with violence the whole time *.

---

Adhere, *v.* to fasten, to hold.
Tenaceous of life, long in dying.

* The city of Gloucester sends annually at Christmas, a present of a rich Lamprey-pie to the King. As Lampreys are at this season extremely rare, this present is usually very costly.

Q. What is the principal genus of the Sturgeon kind of cartilaginous fish?

A. The principal genus of this class is Accipenser, or the Sturgeon, of which there are three species, two only of which deserve particular notice, Accipenser Huso and Accipenser Sturio.

Q. Describe Accipenser Huso.

A. Accipenser Huso, or the Isinglass Fish, is found chiefly in the Danube and the rivers of Russia. Its body is smooth, having neither prickles nor *protuberances*, and the skin is so tough that it is employed in drawing wheel carriages. It grows to twenty-four feet in length, and from the sound and scales isinglass is made; from the mouth *depend* four cirri or appendages resembling small worms.

Q. Is not the Sturio a remarkable fish?

A. Accipenser Sturio, or the Sturgeon properly so called, is an inhabitant both of the salt water and fresh, ascending large rivers in the spring—Contrary to all other fish of the cartilaginous kind it is *oviparous*. It frequently attains the length of eighteen or twenty feet, and has a formidable

---

Protuberances, *s.* knobs or bunches.
Depend. *v.* hang down.
Ovip'arous, bringing forth eggs.

appearance; but is a harmless and even a spiritless fish, suffering itself to be taken without the least resistance, and to be drawn out of the water like a lifeless lump.

Q. Is this fish valuable?

A. Yes; highly so; its flesh is delicate, firm, and white as veal, and extremely good when roasted, but it is generally pickled. Of its roe, or eggs, caviare is made.

Q. Are there not cartilaginous fish that cannot be classed under the forementioned genera?

A. Yes; such as, the Disdon or Sun Fish, which grows to a great size and resembles a bream or other deep fish with the lower half cut away. One species of the Disdon, the Hystix or Globe-fish, is so called, because it has the power of *inflating* itself and becoming round like a globe or ball. Also, the Syngnathus Hippocampus, or Sea-horse fish, and some others of little note.

Q. Is there not a curious marine animal ranked among this class?

A. Yes; The Galley Fish resembles a transparent bubble reflecting the most brilliant colours. It is however a cartilaginous body, covered

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Inflating, *part.* swelling, blowing itself up.

with a thin skin filled with air; it floats on the surface of the sea, and occasionally *expands* eight broad feet or fins to catch the gale. Its skin is covered with a slimy substance, which *corrodes* the hands that touch it and occasions pain.

## CHAPTER V.

### *Of Spinous Fish.*

Q. How are Spinous Fish distinguished?

A. Spinous or bony fish are distinguished by their having a complete bony covering to their gills, by their being destitute of lungs, by their bones being sharp and thorny, and by their tails being perpendicular to the body.

Q. Is this class numerous?

A. So much so that it will be impossible in this little treatise, to do more than to notice the most important.

Q. How is this class divided?

A. Spinous fish are divided into prickly finned fish and soft finned fish, and these are again subdivided into *Apodal*, *Jugular*, *Thoracic*, *Abdominal*, according to the situation of the fins.

---

Expands, *v.* spreads out.
Corrodes, *v.* renders sore.

## CHAPTER VI.

### *Of Prickly-finned Apodal Fish.*

Q. How many genera are found of prickly-finned Apodal Fish?

A. Three: 1. The Ophidium. 2. The Trichiurus. 3. The Xiphias.

Q. How many species compose the genus Ophidium?

A. Of the genus Ophidium, or Gilthead, there are four species, of which the Ophidium-barbatum will serve as a specimen. It has a small head, the upper jaw rather longer than the under, and both beset with a great many small teeth. It is from eight to fourteen inches in length, is found in the Adriatic and Mediterranean seas, but is not much esteemed for the table.

Q. Is the genus Trichiurus numerous?

A. No; it contains only two species, Argenteus and Electricus.

Q. Describe the first of these species.

A. Thrichiurus Argenteus, or Silver Trichiure, has the body of considerable length, and shaped like a sword; the whole fish, except the fins, is of a brightish silver colour, with a lateral yellow line

from the gills to the tail. It is from two to three feet in length, of a very voracious nature, and in pursuit of its prey sometimes leaps into small vessels sailing by. It is a native of South America, some parts of India, and China.

Q. Describe the Trichiurus Electricus.

A. The Trichiurus Electricus, or Electrical Trichiure, differs but little from the former, except in its colour, which is pale brown, and in its possessing the power of giving slight electrical shocks. It is a native of the Indian seas.

Q. Are there many species of Xiphias?

A. Of the Xiphias there is only one species, Xiphias Gladus which sometimes visits our shore, but is common in the Mediterranean sea. Its body is of a *cylindrical* shape, it has no teeth in its mouth, and the upper jaw terminates in a long sword-shaped rostrum or beak, from which it is called the sword-fish.

Q. Is this genus formidable?

A. Yes; it is a terrible enemy to the whale. "At the sight of this, comparatively little, animal," says Anderson, "the whale seems agitated in an extraordinary manner, leaping from the water as if with affright, and endeavouring to escape:

Cylindrical, *a.* long and round.

finding this impossible, it attempts to strike its adversary with its tail, but the sword fish, as active as its opponent is strong, easily avoids the blow; then bounding into the air, it falls upon its enemy, and inflicts such terrible wounds that the sea is soon dyed with blood. In vain the enormous animal attempts to reach its invader, and strikes the water with its tail with astonishing force."

Q. In what estimation is this fish held?

*A.* The Xiphias is much esteemed by the Sicilians, in whose seas it is chiefly found; and the method of taking it is the same as in the days of Strabo *.

Q. Describe the method of taking it.

*A.* A man ascends a projecting cliff, and as soon as he descries the fish, gives notice to another stationed in a boat below. This man ascends the mast, and as soon as he sees the sword fish, directs the rowers towards it; when the boat is within reach, he descends; with a long spear he strikes the fish, and after having suffered it to weary itself, takes it into the boat.

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* Strabo was a celebrated Roman geographer.

## CHAPTER VII.

### *Of Prickly Finned Jugular Fish.*

Q. NAME the principal genera in this order.

*A.* 1. Trachinous or Weever. 2. Uranoscopus. 3. Plennius.

Q. How many species of Trachinus are known?

*A.* Two only; Trachinus Draco and Trachinus Osbeckii.

Q. Describe Trachinus Draco,

*A.* Trachinus Draco, or Dragon Weever, is of a lengthened shape, and covered with small scales that are easily detached from the body; the mouth is wide and opens *vertically*, and the jaws are armed with sharp teeth. It is about ten or twelve inches long, and of a silvery colour, with a dusky yellow cast on the back.

Q. Is not this species armed with a formidable weapon?

*A.* Yes; its first dorsal fin is armed with spines with which it inflicts a severe and dangerous wound, if accidentally trodden on, as it lies em-

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Vertically, *ad.* perpendicularly; in the direction of a straight line up and down.

bedded in the sand. If the wound be in the hand, a redness suddenly extends itself through the whole length of the arm, attended with heat, pain, and inflammation; but it does not appear, from an inspection of the spine, that it possesses any poisonous properties. This fish feeds on insects, worms, and small fish; can live many hours out of water, and is esteemed excellent food.

Q. What distinguishes the Osbeckii?

A. Trachinus Osbeckii, is a native of the Atlantic Ocean, is of a white colour spotted with black, has jaws of equal length, furnished with several rows of strong and sharp teeth, besides some in the throat; little farther is known concerning it.

Q. How many species does the genus Uranoscopus contain?

A. Of the Uranoscopus, or Star-gazer, there are only two species, Scaber and Gapanicus; a description of the former will suffice to give an idea of the genus.

Q. Describe the Scaber.

A. Uranoscopus Scaber, or Bearded Star-gazer, is usually about twelve inches in length, of a brown colour, and has a large head, covered with pro-

tuberances like warts; the tongue is thick, short, and roughened with numerous small teeth; on the lower jaw is a long cirrus or beard.

Q. Is not its manner of taking its prey extremely singular?

*A.* Yes; in the Mediterranean and northern seas, it is found for the most part near the shores, where it lies concealed in the mud, the tip of the head alone exposed; in this situation it waves the beard-like *processes* of its mouth, which, being of a red colour, are mistaken by the smaller fish for worms, and thus they are allured to their destruction. It is a coarse fish, and in no request.

Q. What may be observed of the Genus Blennius?

*A.* Of the Genus Blennius, there are thirteen species, of which the Blennius Viviparus is the only one found in the rivers of Englnnd. It is sometimes taken a foot in length, is of a slender make, and its back-bone is of a green colour. It is a *prolific* fish, having two or three hundred young at once; but it is coarse, and eaten only by the poor. The Blenny is common in the river Esk, in Yorkshire.

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Processes, *s.* things which proceed.
Prolific, *a.* from producing great numbers of young.

## CHAPTER VIII.

### *Of Prickly-finned Thoracic Fish.*

Q. Enumerate the principal genera of prickly finned thoracic fish.

*A.* The genera best known and most deserving of attention are, 1. Gobius; 2. Coryphæna; 3. Scomber; 4. Perca; 5. Mullus; 6. Trigla; 7. Cottus; 8. Gasterosteus; 9. Scorpæna.

Q. Are there many species of the Gobius?

*A.* The genus Gobius contains eight species, but Gobius Niger and Gobius Cœruleus are all that demand particular attention.

Q. Describe Gobius Niger.

*A.* Gobius Niger or the common Goby, is a native of the Mediterranean, and is usually about six inches in length; its head is rather large, body slender, colour dusky, and the fins of a pale blue. It is but little esteemed as food.

Q. Is the Cæruleus a remarkable Species?

*A.* Gobius Cæruleus, or the blue Goby, is small but exceedingly beautiful, its general colour being a fine blue, the tail red, with a black border. It is common on the eastern coast of Africa; and, from the brilliancy of its colours, it appears,

when swimming in a bright sunshine, like a small tube of sapphire, tipped with carbuncle.

Q. What is known of the genus Coryphæna?

*A.* In the genus Coryphæna, there are twelve species, but of these the Blue and Parrot Fishes are most deserving description. The head of the former resembles that of the spermaceti whale, and the whole body is blue. it is found in the tropical seas.

Q. Describe the Parrot fish.

*A.* The Parrot Fish is covered with large green scales, and variegated with different colours, the tail is large, forked and green with a curved red line and a yellow spot on each side. It inhabits the seas near Hispaniola, Cuba, and the Bahama Islands.

Q. What deserves notice of the genus Scomber?

*A.* In the genus Scomber are twenty-two species, but it will be sufficient here to notice two only. Scomber Scomber, and Scomber Thynnus.

Q. What is Scomber Scomber?

*A.* Scomber, or the common Mackrel, is a beautiful fish, but too well known to need description; its excellencies as an *edible* fish is equal

*Edible, a.* eatable from *edo* to eat.

to its beauty; during the severity of winter it is said to be embedded in the soft-mud, protected by the vast masses of ice that surround the polar coasts; in the spring it *migrates* in enormous shoals to the more southern regions, and affords an abundant and delicate article of food to thousands both poor and rich.

Q. Is Scomber Thynnus a valuable species?

*A.* Yes; Scomber Thynnus, the Tunny, grows to a large size, sometimes to the length of eight or ten feet, but its most usual length is two feet. It is frequent in the Mediterranean, Northern, Indian, and American Seas, where it is met with, in large shoals; but in the British seas only a few solitary individuals are occasionally found.

Q. What are the general habits of this fish?

*A.* The Tunny is an animal of great strength and fierceness, preying on all kinds of the smaller fish, but more particularly on the mackerel and flying fish. Its general colour is a dark blue on the upper parts, and silvery, with a cast of flesh colour beneath.

Q. In what manner is the Tunny fishery conducted?

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Migrate, *v.* to remove from one place to another.

A. The Tunny fishery is carried on principally on the coast of Sicily and in other parts of the Mediterranean, in the spring, by means of very extensive nets, spread in the direction in which the fish are expected to come. As soon as the shoal is discovered by a man stationed on some lofty eminence, to have entered the farthest compartment of the nets, he gives a signal, the passage is drawn close, and the slaughter begins.

Q. How are they disposed of?

A. Vast numbers of these fish are consumed by the inhabitants of Naples and Sicily, from May to October they are eaten fresh, but the rest of the year salted; the largest are cut in pieces and barrelled up for sale.

## CHAPTER IX.

*Of Prickly finned thoracic Fish* (*continued*).

Q. Of what Species is the genus Perca composed?

A. In the genus Perca, are not less than forty species, but not more than two require particular notice; these are Perca Fluviatilis, and Perca Lucioperca.

Q. What is Perca Fluviatilis?

A. Perca Fluviatilis, or the common perch, is an inhabitant of clear rivers and lakes in most parts of Europe; it grows sometimes to a large size, but is in general from six to fifteen inches in length; its colour it a brownish olive, marked by several dark transverse bars; the dorsal fin is of a pale violet brown, with a spine on the forepart; the rest of the fins and the tail are red.

Q. What are the general habits of this species?

A. The perch is a social fish, being generally seen in shoals; it frequents deep holes in rivers which flow with a gentle current. So tenacious is this species of life, that it will survive being taken out of the water many hours, if packed in dry straw. It is esteemed as a delicate fish for the table.

Q. What may be observed of Perca Lucioperca?

A. Perca Lucioperca, or the sandre perch, is of a rather more lengthened shape than the former species, and, like the pike, the lower jaw protrudes beyond the upper; its general colour is a silvery grey, with numerous blackish bands. It is found in the rivers and lakes of middle Europe, and highly valued for the table.

Q. How many species are contained in the genus Mullus?

A. There are six species of this genus, the most interesting of which are Mullus Ruber and Mullus Barbatus.

Q. Describe Mullus Ruber.

A. Mullus Ruber, the Red Surmullet, is of an elegant rose colour, tinged with olive on the back; it is exceedingly active, and feeds principally on small fish, worms, and insects. By the Romans this was held in such high estimation, that sometimes enormous sums were given for it; it was frequently brought alive to table in glass vessels, that the guests might enjoy the pleasure of contemplating the beautiful changes of its colours as it was expiring. It is found chiefly in the Mediterranean and northern seas.

Q. Is not the Mullus Barbatus a delicate species?

A. Yes; so highly was this species valued by the Romans, that they are said to have often given for it its weight in silver. Its colours when expiring, are inconceivably beautiful, and its flesh is exceedingly delicious.

Q. How many species compose the genus Trigla?

A. The genus Trigla is composed of fourteen species, of which,—1. Trigla Guynardus, the Grey Gurnard; 2. Trigla Lyra, the Piper Gurnard; 3. Trigla Cuculus, the Cuckoo Gurnard;

and, 4. Trigla Hirundo, the Sapphirine Gurnard, are the most common in the European seas; but, Trigla Volans, or the Flying Gurnard, is the most remarkable species of this genus with which we are acquainted.

Q. Describe Trigla Volans.

A. Trigla Volans, or the Flying Gurnard, is about twelve inches long, and of a beautiful crimson colour above and whitish beneath: the head is armed on each side with two strong and large spines pointing backwards; the pectoral fins are extremely large, which enables the animal to fly out of the water to a considerable distance. It is a native of the Mediterranean, the Atlantic, and Indian seas, where it swims in shoals.

Q. Is the Cottus an important genus?

A. No; the fish of this genus are small, and it contains only six species, of which we shall select Cottus Gobio and Cottus Scorpius for description.

Q. What is Cottus Gobio?

A. Cottus Gobio, or the river Bull Head, is very common in the clear brooks of this country, where it lies at the bottom, either on the gravel or under a stone; it seldom exceeds three inches and a half in length, but its head is disproportionably large, and the general colour of the fish, dusky, mixed

with a dirty yellow; it is, however, excellent for the table.

Q. Does the Scorpius differ much from the Globio?

A. Scottus Corpius, or the Father Lasher, seldom exceeds eight or nine inches in length, but the head is large, and has a most formidable appearance, being armed with spines, which it can oppose to an enemy, by swelling out its cheeks and gill-covers; the mouth is large; the jaws and roof of the mouth furnished with very small teeth. This species is frequent in the Newfoundland and Greenland seas.

Q. How many species compose the genus Gasterosteus?

A. Of the Gasterosteus, there are eleven species, the Gasterosteus Aculeatus will serve as an accurate specimen of the whole.

Q. Describe Gasterosteus Aculeatus.

A. Gasterosteus Aculeatus, the Stickleback, though very common in ponds, rivers, and marshes, is a beautiful little fish, the gills and abdomen being a bright red, the back a fine olive green, and the sides silvery. It is an active and vigorous animal, and preys upon insects, worms, and

the spawn of other fish; hence it is highly prejudicial to fish-ponds.

Q. Do not these fish appear in some places periodically?

A. Yes; once in seven years these little creatures are said to appear in the river Welland in such prodigious numbers, that a man has been known to gain four shillings a-day by taking them and selling them for manure, at the rate of a half-penny per bushel.

Q. For what is the genus Scorpæna remarkable?

A. The species of the genus Scorpæna are remarkable for their uncouth and even disgusting appearance, though most of them are excellent for the table; there are nine species, but a description of one will afford a general idea of the rest.

Q. What species do you select for that purpose?

A. Scorpæna Horrida, horrid Scorpæna. This species resembles rather a monster of deformity than a regular production of nature; the head is very large, perfectly abrupt, and marked by numerous tubercles, depressions, and spines; the mouth is wide, and resembles a horse shoe in shape. The general colour of this fish is a rusty brown. It is a native of the Indian seas, and measures twelve or fifteen inches in length.

## CHAPTER X.

### *Of Prickly-finned Abdominal Fish.*

Q. What are the principal genera in the class of Prickly-finned Abdominal Fish?

A. The principal genera in this class are—1. Silurus; 2. Mugil; 3. Polynemus; 4. Elops.

Q. What species compose the genus Silurus?

A. The genus Silurus, contains twenty-eight species, all of which have large depressed heads, wide mouths, bearded by long tentacula, body without scales. Silurus glaris is the most remarkable of this genus.

Q. Describe Silurus glaris.

A. Silurus glaris, the European Silure, is, next Accipenser Huso, the largest of river fish, measuring sometimes fifteen feet, and weighing three hundred pounds. In general, however, it does not exceed three feet; it for the most part continues inactive in the mud at the bottom of the river, where, by waving its tenticula, or beard, which the smaller fishes mistake for worms, it entices its prey within reach, seizes and devours them. Its flesh is in no great esteem, but is eaten, both fresh and salted, by the common people; its skin, when prepared, is hard and transparent as

horn, and is used in some of the northern regions in windows as a substitute for glass.

Q. Is the Mugil an extensive genus?

A. The genus Mugil contains nine species, of which Mugil Cephalus, or the common Mullet is best known. It is an inhabitant of the Mediterranean; is generally from twelve to sixteen inches long, and feeds on worms, insects, and marine vegetables. It is of a bluish grey colour, dark on the back, and silvery on the abdomen.

Q. What are its peculiar habits?

A. The Mullet may frequently be seen near the shore, burrowing in the mud in search of food, and leaving a round hole. In the spring, this fish assembles in shoals, for the purpose of passing up the rivers, like salmon, and it is at this period that the fishermen surround them with nets, and endeavour to secure their prey. Many wonderful stories are, however, told of their address in escaping the snare. It is an excellent fish for the table.

Q. Are the species of the genus Polynemus numerous?

A. There are at present only three species known, 1. Polynemus Paradiseus; 2. Polynemus Plebeis; 3. Polynemus Niloticus.

Q. What is Polynemus Paradiseus?

A. Polynemus Paradiseus, or Mango fish, is of an elegant shape, and has certain rays or filaments proceeding from the base of the pectoral fins, considerably beyond the tail; it is of a yellowish colour, is an inhabitant of the Indian and American seas, and is highly valued as an article of food.

Q. What may be observed of the other species?

A. Polynemus Plebeis is a large species, sometimes measuring four feet in length; it inhabits the same seas as the preceding, and is likewise esteemed excellent. Polynemus Niloticus, as its name imports, is found in the Nile, and grows to a large size. The whole body is covered with scales of a silver colour.

Q. Is not this species taken in a singular manner?

A. Yes; the Egyptian peasants form a large cake of ingredients that will attract the fish; in the midst of this cake, several hooks with dates * on them are concealed, and to each hook a string is attached. A man having sunk the mass in the middle of the stream, carries the ends of the strings on shore, and fastens each of them to a separate palm branch, to which a small bell is attached.

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* A fruit peculiar to hot countries.

The cake being soon dissolved by the action of the stream, the fish seize the dates, are caught by the hook, and the little bell gives notice to the fisherman, who immediately secures his prize; sometimes he finds a fish on every hook.

Q. What species compose the genus Elops?

A. Of the genus Elops there is but one species, the Saurus, or Scar Fish, which inhabits the coast of Carolina; its body is long and slender, and covered with large angular scales; the tail is armed with a long spine both above and beneath.

## CHAPTER XI.

*Of Soft Finned, Apodal, and Jugular Fish.*

Q. What are the principal genera of Soft Finned Apodal Fish?

A. The genera most deserving our attention in the class of Soft Finned Apodal Fish are—1. Muræna; 2. Gymnotus.

Q. Enumerate the most interesting species of the genus Muræna.

A. Besides the eel, so well known as to need no description, there are—1. Muræna Helena; 2. Muræna Conger, and six other species.

Q. Describe Muræna Helena.

A. Muræna Helena, or the Roman Muræna, is

about the size of the common eel, and is plentiful on the coasts of the Mediterranean; it is of a dusky greenish brown colour, variegated with dull yellow spots. It can live with equal facility both in salt water and fresh.

Q. Was not this fish in great esteem among the Romans?

A. Yes; it was considered by them as one of the greatest luxuries of the table, and was kept in reservoirs appropriated for the purpose.

Q. What instances of barbarous cruelty does Pliny relate as connected with the history of this fish?

A. Pliny relates that one Vedius Pollio was celebrated for the exquisite flavour of his Muræna. One day, the Emperor Augustus having honoured this man with a visit, a young slave had the misfortune to break a crystal vase. The unhappy wretch instantly flew to the feet of Augustus, and earnestly entreated to be put to death in any other way than that to which he was condemned. On inquiry, it was found that this luxurious monster was in the habit of causing his offending slaves to be cut in pieces and thrown to feed his Murænæ.

Q. How did Augustus punish this inhuman cruelty?

A. He set the unhappy slave free; commanded all the crystal vessels in the house to be broken before his face, and the reservoirs to be filled

up, but spared the monster's life on account of former friendship.

Q. What is Muræna Conger?

A. Muræna Conger, or the Conger Eel, is a large species, inhabiting the European seas and rivers. It is extremely voracious, preying upon other fish, upon crabs before the shell is become hard, and carcases that may happen to float near its haunts.

Q. How many species compose the genus Gymnotus?

A. This genus consists of no less than fifteen species, one of which, Gymnotus Electricus, is a phenomenon that deserves a minute description.

The Gymnotus Electricus, or Electrical Eel, inhabits the larger rivers of Africa and America, particularly those of Surinam. It bears a general resemblance to an eel, but grows sometimes to the length of ten feet, and is of a uniform blackish brown colour.

Q. What renders this fish particularly remarkable?

A. Its wonderful electrical powers; if this fish be touched with one hand, a shock is felt similar to that received from a charged phial; if by both hands, the shock is conveyed through the breast in the usual manner. When this fish is in its native waters, it gives a shock to those who happen incautiously to tread upon it when bathing, so strong as almost to deprive them of sense and motion.

Q. Is this extraordinary faculty useful to the animal?

A. Yes; it is by this extraordinary faculty that the Gymnotus supports its existence; the small fishes and other animals that happen to approach it, being instantly stupified, and thus rendered an easy prey.

Q. What is the most interesting genus of the Soft Finned Jugular fish?

A. Of the Soft Finned Jugular fish, the Gadus, or Cod, is the most interesting genus; it contains seventeen species, five of which we shall describe. 1. Gadus Morhua; 2. Gadus Æglefinus; 3. Gadus Merlangus; 4. Gadus Merluccius; 5. Gadus Molva.

Q. Describe Gadus Morhua.

A. Gadus Morhua, or the common Cod, is an exceedingly valuable fish, chiefly inhabiting the northern seas, but migrating towards the south at stated periods. It is sometimes found very large, but its usual weight is from about fourteen to forty pounds; the colour of the back is cinereous *, the belly silvery.

Q. What is the usual food of this species?

A. The Cod is very voracious, and will feed on almost any *edible* substance, small fish, worms,

* Of the colour of ashes.
Edible, *a.* that may be eaten.

and even shell fish, are its ordinary food, and so strong is its digestion, that even the very shells it swallows are almost wholly dissolved.

Q. Where is the most important fishery for Cod?

A. The most important fishery for Cod is on the great sandbank, near Newfoundland. This sandbank, or elevation at the bottom of the sea, is above five hundred miles long and three hundred broad, and thither these fishes resort in immense multitudes. At the proper season great numbers of ships are employed in this fishery, which is all carried on by the hook and line; the fish, when taken, are cleansed, salted, and dried, and in this state sent to almost every part of the world.

Q. How may Gadus Æglifinus be distinguished?

A. Gadus Æglifinus, or the Haddock, may be distinguished from the rest of this genus, by having a forked tail, and the lower jaw longer than the upper; its colour is silvery, and it has a black spot on each side, above the pectoral fins. It is in general from eighteen inches to two feet in length, but it sometimes attains to a much greater size.

Q. Where is the Haddock chiefly found?

A. The Haddock is a native of the northern seas, but at stated seasons it visits particular coasts. An immense shoal, three or four miles in length, and nearly as many in breadth, visits the coast of Yorkshire every winter, and affords a cheap and excellent food to the poor.

Q. Is the Gadus Barbatus an esteemed species?

A. The Gadus Barbatus, or Whiting Pout, is a small species, seldom exceeding a foot in length, but it is in high estimation as food; it is of a silvery white, but rather dusky on the back, which is very much arched.

Q. Does not the Gadus Merlangus resemble this species?

A. In nothing except its length; the Merlangus being of a much more slender shape, the head and back of a pale brown, the sides of a silvery yellow. It is an inhabitant of the northern seas, and is caught in great numbers by the hook, baited with a sprat or young herring.

Q. What is the Gadus Merluccius?

A. Gadus Merluccius, the Hake, is a large species, measuring from one to three feet in length; the head is rather large, the jaws armed with two rows of long sharp-pointed teeth. It is not a delicate fish; and is, therefore, seldom admitted to the tables of the opulent, but it forms a cheap and wholesome article of food for the poor. It is common, at certain seasons, on our coasts.

Q. Describe Gadus Molva.

A. Gadus Molva, the Ling*, is a large species, usually three or four feet, and sometimes even seven feet in length. Its colour is either olive or

* A corruption of long.

cinereous * on the back, the abdomen silvery. Vast numbers of this species are taken on our coasts in the spring, the greatest part of which are salted and barrelled for exportation and home consumption.

## CHAPTER XII.

### *Of Soft Finned Thoracic Fish.*

Q. WHAT are the principal genera of Soft Finned Thoracic Fish?

A. The principal genera of this order are—1. Pleuronectes; 2. Echeneis.

Q. Does the genus Pleuronectes contain many species?

A. The genus Pleuronectes, the generic characters of which are,—eyes both on the same side of the head, body compressed like the Ray kind, contains seventeen species, of which we shall notice—1. Pleuronectes Hippoglossus; 2. Pleuronectes Platessa; 3. Pleuronectes Limanda; 4. Pleuronectes Flesus; 5. Pleuronectes Solea; 6. Pleuronectes Tuberculatus.

Q. Describe Pleuronectes Hippoglossus.

A. Pleuronectes Hippoglossus, the Holibut, is an exceedingly large species, having sometimes been found of the weight of three and even four hundred pounds. It is a very voracious animal, feeding on small fish, crabs, and shell fish. It is not

* Ash coloured.

much esteemed for the table. In the London markets it is usually cut into large pieces for sale.

Q. What may be observed of Pleuronectes Platessa?

A. Pleuronectes Platessa, the Plaice, is a native of the northern seas, and common on our own coasts; its usual weight is eight or nine pounds, but it is sometimes found much larger. It is very broad and flat, of a fine palish brown above, and marked with numerous orange coloured spots; the mouth is small, furnished with small and rather blunt teeth, and the under jaw is longer than the upper.

Q. What is the Pleuronectes Limanda?

A. Pleuronectes Limanda, or the Dab, is of a very broad *ovate* shape, of a yellowish brown colour above, and white beneath. It inhabits the Mediterranean, the Baltic, and the northern seas, and, though small, is considered as excellent food.

Q. What is the Pleuronectes Flesus?

A. Pleuronectes Flesus, or the Flounder, resembles the plaice in shape, but is smaller and of more obscure colours. It is found in the same seas as the preceding, and in our rivers, at a considerable distance from the salt water. This fish is very tenacious of life, continuing alive for a long time after being caught.

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Ovate, *a.* inclining to oval.

Q. Describe the Pleuronectes Solea.

A. Pleuronectes Solea, or the Sole, is sometimes found of the length of more than two feet, though in general it is much less; it is too well known to need description, and is, by some, esteemed as more delicate eating even than the Turbot. The sole delights in lying at the bottom of the sea, preying on small shell-fish, spawn, sea insects, &c. it is usually taken with a net.

Q. What is remarkable of the Tuberculatus?

A. The Pleuronectes Tuberculatus, or Turbot, is, next to the Holibut, the largest fish of this genus, and in high request among those who delight in the pleasures of the table. It is of a dark brown above, marbled with blackish spots, and white beneath; the skin is wrinkled and covered with spines.

Q. What are the general habits of this species?

A. The Turbot, like the rest of the genus, generally lies in deep water, feeding on worms, shell-fish, and marine insects; it is taken in great quanties about the northern coasts of Holland, France, and England, with lines, sometimes three miles in length, furnished with above two thousand five hundred hooks, and baited with bits of herring, haddock, &c. but more particularly with the river lampreys, of which it is excessively fond.

Q Are there many species of the Echeneis?

A. Only two; 1. Remora with a forked tail;

2. Neucrates with an undivided tail. Both these species have a naked depressed head and body, and are remarkable for being frequently found adhering so firmly to the sides of sharks and other great fish, by means of the structure of the head, as to be got off with difficulty. The ancients fancied that the remora, by adhering to the bottom, could stop the largest ship when in full sail.

## CHAPTER XIII.

*Of Soft Finned Abdominal Fish.*

Q. What are the principal genera of this order?

A. 1. Atherina; 2. Salmo; 3. Fistularia; 4. Esox; 5 Clupea; 6. Exocætus; 7. Cyprina.

Q. What species compose the genus Atherina?

A. Of the genus Atherina, there are five species; but it will suffice to describe the Atherina Hepsetus, or common Smelt, found in abundance in the sea near Southampton, and on other coasts of our island. It is about four inches long, has a forked tail, and an almost transparent skin; colour, silvery tinged with yellow.

Q. What is the genus Salmo?

A. This is a very comprehensive genus, containing many species; the most remarkable of which are—1. Salar; 2. Trutta; 3. Fario; 4. Salmulus; 5. Salvelinius; 6. Eperlanus; 7. Greenlandicus; 8. Thymallus.

Q. What is the Salmo Salar?

A. The Salmo Salar, or common Salmon, is from two and a half to three or more feet in length; of a silvery grey colour, darkest on the back, and marked with many irregular spots; it is chiefly an inhabitant of the northern regions, where it is found, at different periods, both in salt and fresh waters.

Q. For what reason does it seek the fresh waters?

A. To deposit its spawn; for this purpose the salmon ascends rivers several hundred miles from their mouth, force themselves against the most rapid torrents, and leap, with surprising agility, over cataracts of several feet in height. Numbers have been seen leaping out of the water in rapid succession, for this purpose, some of which succeeded and others failed in the attempt.

Q. Are they caught in great numbers?

A. They are very abundant in some of the rivers of England; and in the Tweed, a river of Scotland, five hundred have been taken at one hawl of the net.

Q. Describe the Trutta.

A. Salmo Trutta, or Salmon Trout, greatly resembles the former, but is usually inferior in size; it is of a purplish or violet colour, thickly sprinkled with round dark spots; its habits and the colour and delicacy of its flesh are the same as those of the salmon.

Q. What is the Fario?

A. Salmo Fario or the common Trout, is well known to delight in clear and gravelly streams, and is found in most parts of Europe; its usual length is about fifteen inches, but some grow to a much greater size; the colour is yellowish grey, with bright red spots; it feeds on small fish and insects, and is particularly fond of the May-fly, after which it will frequently leap out of the water.

Q. What is the Salmulus?

A. The Salmo Salmulus, or Samlet, is a small species, thought by some to be the *fry* of the common salmon, but this is a mistake; it resembles the salmon in shape, but seldom exceeds eight inches in length; it is common in Scotland, where it is called the Parr; and in the river Wye under the name of Skirling or Laspring.

Q. What is the Salvelinus?

A. Salmo Salvelinus, or Salvelin Trout, is usually about twelve inches long, rather more slender in proportion than the salmon, and of a brownish blue colour, with red spots; the belly orange colour; it is delicate food, and is found in the lakes of Germany and of Siberia.

Q. Describe the Eperlanus.

A. Salmo Eperlanus, or the Smelt, is usually about six inches long, and is a very elegant fish, almost transparent; its back of a greenish white,

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Fry, *s.* young of fish.

the rest of the body of a bright silvery hue. It inhabits the European seas, and at certain seasons is found in great abundance in some of the rivers of England.

Q. What is remarkable in the Groenlandicus?

A. Salmo Groenlandicus, or the Greenland Salmon, is about seven inches in length, and of a pale green colour; it is remarkable for having the scales of its sides upright, by means of whch several of these fish will be united, as though glued together, so that if one be taken the whole are caught.

Q. What is the Thymallus?

A. Salmo Thymallus, or the Grayling Salmon, called by some, the Umber, is an elegant species, and grows to the length of about eighteen inches. It resembles the trout in shape, but is rather more slender; and is of a beautiful silvery grey colour, with numerous stripes; it is a highly esteemed fish, and is found in many of the rivers of England.

Q. Are there many species in the genus Fistularia?

A. In the genus Fistularia, or Pipe Fish, there are but few species, of which the Fistularia Tabacaria, or Slender Pipe Fish, will be a sufficient example. It grows to the length of three or four feet, resembling an eel in shape, but having a head nine inches long, the mouth toothless and pointed;

the tail is deeply forked, and a long pointed spine springs from the middle of the fork, of a substance like whalebone. It is found in Brazil, and another species in China.

## CHAPTER XIV.

*Of Soft Finned Abdominal Fish (continued).*

Q. What species compose the genus Esox?

A. Of the genus Esox there are nine species, of which the principal are—1. Lucius; 2. Sphyræna.

Q. What is the Lucius?

A. Esox Lucius, or common Pike, is a native of almost all the rivers of Europe, but the largest are those of Lapland, which sometimes exceed eight feet in length. The head of this fish is very flat, the upper jaw shorter than the lower, which turns up a little at the end; the teeth are numerous and sharp, covering the roof of the mouth and sometimes the tongue; it is of a pale olive grey colour, the abdomen white.

Q. What are the peculiar habits of this fish?

A. It is the most voracious of all river fish, attacking not only its own species, but even seizing on animals that come to drink at the river. Many stories are told of the boldness of this fish, and that it will sometimes seize the legs of bathers who may happen to approach it. It is said to live to a great age.

Q. What is the Sphyræn ?

A. Esox Sphyræna, or the Sea Pike, considerably resembles the common Pike, but is of a silvery blue colour; it is an inhabitant of the Mediterranean and Atlantic seas, and is esteemed excellent for the table.

Q. Is there not another large species ?

A. Yes; Esox Barracuda, or the Barracuda Pike, which grows to the length of seven or eight feet. It is said to be an extremely strong, fierce, and dangerous fish, as it will sometimes attack and destroy bathers, like the shark. Its flesh is disagreeable, and by some said to be poisonous.

Q. Are there many species of the genus Clupea?

A. A great many; the principal of which are—1. Harengus; 2. Sprattus; 3. Encrasiolus; 4. Alosa.

Q. What is the Harengus ?

A. Clupea Harengus, or the common Herring, is a well known fish, that is found in vast numbers in the northerly regions. An immense shoal of this fish appears off the Shetland isles in June, divided into distinct columns of five or six miles in length and three or four in breadth, reflecting, when the sun shines, a variety of splendid colours.

Q. Is the Herring a valuable fish ?

A. It is one of the most beneficial presents which the great Creator has bestowed on his creatures, as many millions are yearly caught, and

either eaten fresh by the common people, or pickled, dried, and packed in barrels, both for home consumption and for exportation.

Q. What is the Sprattus?

A. Clupen Sprattus, or the Sprat, bears a great resemblance to the herring, but is much smaller. It is found in the Thames in November, in great abundance, but quits it in March for the sea.

Q. What is the Encrasiolus?

A. Clupea Encrasiolus, or Anchovy, is a small fish, having the upper jaw longer than the under one; the principal fishery is at Georgia, near Leghorn, where they are pickled to serve as sauce to other fish.

Q. Describe the Alosa?

A. Clupea Alosa, or Shad, has a forked snout, and black spots on the sides. It is found in the Severn in great perfection in April and May, and is esteemed more delicate eating even than the salmon.

Q. Is there not an inferior species?

A. Yes; the Shad found in the Thames is esteemed a coarse fish, and there is a species which inhabits the Severn, called the Thwaite, that greatly resembles the Shad, but is infinitely inferior in flavour.

Q. What is the Exocætus?

A. The Exocætus, or Flying Fish, is an inhabi-

tant of the *tropical seas;* the head is scaly, and it has no teeth; it is of a whitish colour, and the pectoral fins, the instruments of flight, are very large and long.

Q. What are the peculiar habits of this genus?

A. It is a fish that appears to lead a most miserable life; in its own element, it is perpetually harassed and pursued by Dorados and other fish of prey. When, by means of its long fins, it flies out of the water to escape these devourers, it meets its fate from the gull or the albatross, or is obliged to drop into the mouths of those ravenous fish, from which it attempted to escape.

Q. Can it fly for an indefinite time?

A. No; for when the fins grow dry by exposure to the air, the fish is obliged to drop into the water to wet them anew. Many hundreds of these animals are seen in the air at once, in the climates where they abound, and they sometimes fall on the decks of ships; they are a palatable and nourishing food.

## CHAPTER XV.

*Of Soft Finned Abdominal Fish (continued).*

Q. Does the genus Cyprinus consist of many species?

A. Yes; not less than thirty-one; those most deserving of attention are—1. Carpio; 2. Barbus;

Tropical seas, seas that lie within the torrid zone.

3. Tinea ; 4. Gobio ; 5. Brama; 6. Rutilus; 7. Leuciscus; 8. Cephalus; 9. Alburnus; 10. Auratus.

Q. Describe the Carpio ?

A. Cyprinus Carpio, or the Carp, is by no means an original inhabitant of this country, but was introduced by Leonard Maschal in the year 1511 ; it chiefly abounds in the rivers and lakes of Polish Prussia, where it grows to an enormous size, and is sent in well-boats to Sweden and Russia ; the Polish nobility draw a considerable revenue from this commerce.

Q. What is remarkable in the Carp ?

A. The Carp is a very long-lived fish, and very *prolific*. It is likewise so extremely cunning as to have obtained the appellation of the river Fox ; it will sometimes leap over the nets of the fishermen, and at others bury itself so deep in the mud as to let the net pass over it.

Q. Will not the Carp live a long time out of the water ?

A. Yes, and even grow fat ; the experiment may be thus tried : put a carp, with a quantity of wet moss, into a net, plunge it into water and hang it up to the ceiling of a cellar ; repeat the dipping, at first every three or four hours, afterwards once in six or seven hours will do. Feed the fish with

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Prolific, *a.* fruitful, producing many young.

small quantities of bread soaked in milk, on this the creature will live and thrive.

Q. What is the Barbus?

A. Cyprinus Barbus, or Barbel, is one of the coarsest and most insipid of our fresh water fish; and so tame as to suffer itself to be taken by the hand; it grows to the length of three feet, and sometimes weighs eighteen pounds. The dorsal fin is armed with a strong spine, with which it can, when provoked, inflict a severe wound.

Q. What is the Tinea?

A. Cyprinus Tinea, or the Tench, was formerly in no great repute, but is now esteemed a very excellent Fish; it is of a dusky colour on the back, the sides and belly of a greenish golden hue, and its shape is short and thick. This fish is fond of still waters, and is, therefore, seldom found in running streams.

Q. What is the Gobio?

A. Cyprinuus Gobio, or Gudgeon, is a small fish, usually found in gentle streams; it will bite eagerly, and may be assembled by raking the bed of the river, whither whole shoals instantly repair in hope of food.

Q. What is the Brama?

A. Cyprinus Brama, or the Bream, is an inhabitant of lakes or the deep parts of still rivers. It is an insipid fish and in little esteem.

Q. Describe the Rutilus?

A. Cyprinus Rutilus, or the Roach, is a coarse fish of this genus, with large scales and red fins; it is *gregarious*, and common in the still deep rivers of the country.

Q. Is not the Leuciscus very similar?

A. Cyprinus Leuciscus, or the Dace, is similar in its habits and haunts, but is much more lively, and has smaller scales; it is fond of frolicking near the surface of the water during the summer months.

Q. What is the Cephalus?

A. Cyprinus Cephalus, or the Chub, is coarse and full of bones; it frequents the deep holes of rivers, but in summer, commonly lies on the surface, beneath the shade of some tree or bush. It is very timid, sinking to the bottom on the least alarm. Its principal food is worms, grasshoppers, caterpillars, &c.

Q. What is the Alburnus?

A. The Alburnus, or Bleak, is very common in many of our rivers, and is seen in shoals. At certain seasons it appears to be in great agonies, tumbling about on the top of the water and incapable of swimming, in about two hours it recovers. It is likewise so tormented with a species of hair worm, that it rises to the surface and dies Artificial pearls are made with the scales of this fish.

Q. What is the Auratus?

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Gregarious, *a.* fond of going in companies.

A. Cyprinus Auratus, or the Gold Fish, is a native of China, and is occasionally seen in this country as an ornament in the apartments of the great. It is a small fish; the male is of a bright red colour from the top of the head to the middle of the body, the rest of the fish of a beautiful gold colour; the female is white, and known by the name of the silver fish.

## CHAPTER XVI.

*Of Crustaceous and Testaceous Fish.*

Q. WHAT is meant by Crustaceous and Testaceous Fish?

A. Those animals, which we sometimes designate under the title of Crustaceous and Testaceous Fish, are what are usually called Shell Fish. The Crustaceous are those with thin shells, as the Lobster, &c.; the Testaceous, those with hard shells all of one piece.

Q. Do modern naturalists class these animals with fish?

A. No; Those of the Crab and Lobster kind are considered as insects *; those of the Tortoise kind as Amphibia, or Reptiles; and those of the Oyster kind as Vermes, or Worms.

Q. Will it be necessary to mention them here?

A. A slight sketch only will be necessary, as a

* Vide Catechism of Entomology. Order, Aptera.

more copious account of them will be given under their respective classes.

Q. What is the Lobster?

A. Cancer Gammarus, or Lobster, is an animal of the crustaceous kind, covered with a black shell, which it sheds every year; and armed with claws, with which it can bite severely; it has four legs on each side, and a small head, from whence project two long feelers or horns; the eyes are black, and of a horny substance, and these the animal can draw in or put forth at pleasure; its tail is jointed and generally folded under the body.

Q. Describe the Crab.

A. Cancer Mænas, or the common Crab, is of a broader and flatter shape than the Lobster, and its tail is merely a broad flap under the belly; the number of legs and claws is the same as in that animal; it is of so voracious a nature, that those who carry it to market are obliged to tie its claws to prevent its devouring the others of its kind.

Q. Is there not a very remarkable species?

A. Yes; Cancer Diogenes, or the Soldier Crab, sometimes called the Hermit Crab, has no natural shell of its own, but inhabits the empty cavities of *turbinated* shells; when grown too large for its present habitation, it seeks along the edge of the water for another more suitable, taking care, however, not to give up the old till suited with a new.

Turbinated, *a.* wreathed like the shell of the snail.

Q. Is this change easily effected?

A. Not always; it is seldom that the animal meets with one that exactly suits till after many trials, and, perhaps, many combats; for there is often a severe contest between two of them for a shell for which they are rivals.

Q. What shell fish are of the Tortoise kind.

A. Of the animals of this kind, improperly denominated fish, the following are the principal—1. Testudo Coriacea; 2. T. Mydas; 3. T. Caretta; 4. T. Imbricata.

Q. What is the Coriacea?

A. Testudo Coriacea, or Coriaceous Turtle, is a very large species, growing to the length of eight feet, and sometimes weighing a thousand pounds. It is of a longer form than the rest of its tribe, and the shell is not horny, but resembling strong leather. A specimen was taken in 1729, upwards of seven feet long; it uttered a most hideous noise, its mouth at the same time, foaming with rage and exhaling a noisome vapour.

Q. What is the Mydas

A. Testudo Mydas, or the Green Turtle, is that species so much in request among epicures; it is so called because its fat is of a greenish tinge; it is a large species, some individuals weighing five hundred pounds. Forty sloops are sent out from *Port Royal* alone for this fishery.

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Port Royal, a town in Jamaica.

Q. How are these Turtles usually taken?

A. Sometimes they are watched on shore, when the men immediately hasten to turn them on their backs, as they cannot get again on their feet, and then carry them off at their leisure. Some are so large as to require three men to turn one of them. At the Bahama islands they pierce them with a kind of spear.

Q. Do these Turtles occasionally reside on land?

A. Marine Turtles never go on shore except to deposit their eggs, which they do in a hole in the sand; these eggs are eagerly sought after, as they are delicious eating.

Q. What is the Caretta?

A. Testudo Caretta, or the Loggerhead Turtle, resembles the Mydas in form (except that its head is larger), and the Coriacea in size; it is the boldest and most voracious of all turtles, fiercely defending itself when attacked. It has been known to bite a large walking stick in two instantaneously. Its flesh is rank and in no esteem.

Q. What is the Imbricata?

A. Testudo Imbricata *, or Hawk's Bill Turtle, receives its classical name from the resemblance of its shell to the tiles of a house, and its common appellation from the likeness of its back to the bill of that bird. This is the only animal of the kind

* From *imbrex*, a tile.

that when turned on its back, can recover its feet; the substance called tortoise shell is made from the shell of this species.

## CHAPTER XVII.

*The same Subject continued.*

Q. How are Testaceous Fish divided?

A. Into—1. Univalves; 2. Bivalves; 3. Multivalves.

Q. How many species of Univalves are there?

A. There are nineteen; the names of which we will give for the sake of reference to larger works; Argonauta, Nautilus, Conus, Cypræa, Bulla, Voluta, Buccinum, Strombus, Murex, Trochus, Turbo, Helix, Nerita, Haliotis Patella, Dentalium, Serpula, Teredo, Sabella. A few observations on the Nautilus and Murex, are all that our limits will allow.

Q. What is worthy of observation in the Nautilus?

A. There are two species of Nautilus, the thick and the thin shelled; the former is, and the latter is not fastened to its shell, but can leave it and return to it at pleasure; the thin shelled species is sometimes seen floating on the surface of the ocean and expanding two arms as sails, while it uses two others as oars; when alarmed, it instantly sinks to the bottom; the inside of the shell of the other

species is divided by partitions, and is much more beautiful than mother of pearl.

Q. What renders the Murex remarkable?

A. It is that species of fish from which the Tyrians obtained their celebrated purple dye. The inhabitants of Peru, on whose coasts it is found, use it for the same purpose in the present day; it something resembles a large snail.

Q. How many species of Bivalves are there?

A. Of Bivalves, or Fish with two shells, opening with a hinge, there are thirteen species; Mya, Solen, Tellina, Cardium Maetra, Donax, Venus, Spondylus, Chama, Arca, Ostrea, Anomia, Mytillus, Pinna. Of these, Solen, Ostrea, Mytillus, and Pinna, are deserving attention.

Q. What is the Solen?

A. The solen, or Razor Sheath, has a long shell resembling the handle of a razor; it is found in the sand by the sea side, where it buries itself in a perpendicular direction, sometimes two feet deep; the fishermen throw a little salt into its hole, when the fish rises as if to see what is the matter, but if not instantly caught, it darts down again, and can never after be enticed to show itself.

Q. What is the Ostrea?

A. Ostrea, or the Oyster, is too well known to need description. Rock Oysters are sometimes found the size of a common plate, and in the East Indies there are oysters whose shells are two feet in

diameter, but they are by no means so palatable as the small species. The oyster is remarkable as producing that beautiful jewel called the pearl.

Q. What is the Mytilus?

A. Of the Mytilus or Muscle, there are many varieties, some inhabiting rivers, others the sea; some excellent food, others nauseous and unwholesome. Unlike the oyster, it is not fixed to one place, but can remove at pleasure.

Q. What is the Pinna?

A. The Pinna is a shell fish which deserves notice for this singular circumstance; being blind, it admits within its shell a species of naked crab, which occasionally goes out to seek for prey; during its absence, the shell of the Pinna remains open; the Cuttle fish seizes this opportunity to attack the Pinna, when the crab, which goes to no great distance, hastens to the defence of its benefactor, the shell is closed, and the enemy disappointed.

Q. How many species of the Multivalves are there?

A. Only three; Chiton, Lepas, and Phloas. Of the first, little is known; the second is the Bernacle, found adhering to the bottoms of ships and to piles driven into the sea, and the third is remarkable for a phosphoric light which it emits, and even imparts to the mouths of those who eat it.

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